Sexual Orientation, Gender, Pregnancy, and Family Composition Discrimination in Mortgage Lending: A Pre-Analysis Plan for a Field Experiment

Catherine Balfe
Research Analyst
Education Research Alliance for New Orleans
Tulane University
cbalfe@tulane.edu

Mary Penn
Ph.D. Student
Department of Economics
Tulane University
mpenn2@tulane.edu

Patrick Button
Assistant Professor
Department of Economics
Tulane University, and
Postdoctoral Scholar
Center for the Study of Aging
The RAND Corporation
pbutton@tulane.edu

David Schwegman
Ph.D. Candidate
Maxwell School of Citizenship and Public Affairs
Syracuse University
djschweg@syr.edu

This Draft: October 26, 2018

Abstract
This paper utilizes an email correspondence experiment to test if mortgage loan originators discriminate against credit-worthy individuals based on their sexual orientation and/or their family structure. We send emails requesting information about home loans to licensed mortgage loan originators (MLOs) in the United States. The emails come from fictitious couples who are either same-sex or opposite-sex couples with and without young children, as well as opposite-sex and lesbian couples expecting children. We signal for sexual orientation by including the names of both the prospective borrower and his or her spouse. In addition to signaling sexual orientation and family structure, we signal credit worthiness (through credit score and employment status) of each potential applicant. We test for differential treatment by MLOs by comparing response quality and response rates. We then quantify the cost of disclosing sexual orientation and/or family structure when applying for a mortgage.

JEL Codes: G21, J12, J16 R31, C93

Keywords: mortgages, discrimination, LGBTQ discrimination, gay and lesbian, correspondence study, pregnancy discrimination
Introduction

Homeownership is a common method for wealth accumulation and is seen as critical for access to desirable neighborhoods and financial stability in the United States (Boehm & Schlottmann, 2008; Killewald & Bryan, 2016; Turner & Luea, 2009). However, research shows that not all individuals have equal access to this avenue for wealth accumulation (Charles & Hurst, 2002; Flippen, 2004; Krivo & Kaufman, 2004; Flippen, 2001; Kuebler & Rugh, 2013; Coulson, 1999). While there exists a large body of research measuring the impact of race and ethnicity on homeownership, there are fewer studies on the effect of sexual orientation and family structure (such as having children or expecting children) on homeownership. Research finds that both same-sex male and same-sex female couples are less likely to own homes than opposite-sex married couples (Jepsen & Jepsen, 2009; Leppel, 2007). And while same-sex male couples buy homes at similar values to opposite-sex couples, same-sex female households own homes of lower average value than those owned by opposite-sex married couples (Jepsen & Jepsen, 2009). While there is no empirical evidence that measures housing discrimination against households with children or those expecting children, the US Department of Housing and Urban Development (HUD) received over a 100 complaints about housing discrimination against households where some member was on maternity/paternity leave (US Department of Housing and Urban Development, 2017).

While there is evidence that gay men and lesbian women are less likely to own homes than their opposite-sex married peers (Jepsen & Jepsen, 2009; Leppel, 2007), there is little research attempting to understand the cause of this gap in homeownership. One possible explanation is differential access to mortgages. For most Americans, homeownership is only made possible through obtainment of a mortgage. According to the National Association of
Realtors, 88 percent of American homebuyers financed their home purchase with a mortgage in 2017, and of those 88 percent of homebuyers, mortgages accounted for an average of 90 percent of their home value (Lautz et al., 2017). However, research finds that not all groups are given fair access to mortgages: there exists a growing body of research attempting to measure discrimination against minorities in the mortgage market (Hanson et al., 2016; Gao & Sun, forthcoming; Ross et al., 2008; Ross & Yinger, 2002; Ladd, 1982; Bayer et al., 2016). Gao and Sun (forthcoming) conduct the first study to measure discrimination on the basis of sexual orientation in the mortgage market, finding that mortgage approval rates for same-sex couples are 3 to 8 percent lower than comparable loan applicants. They also find that once approved, same-sex couples experience financing costs 0.02 to 0.2 percent higher than equally qualified loan applicants (Gao & Sun, forthcoming).

More broadly, LGBTQ people face significant stigma and there is evidence that they face discrimination in other contexts. While rates of acceptance of same-sex marriage as well as same-sex parenting or adoption have continued to increase since the 1990s, around 30 percent of Americans still oppose same-sex marriage and 35 percent oppose same-sex adoption (Pew Research Center, 2017; Jones & Saad, 2017; Jones & Saad, 2014). Audit/correspondence studies of discrimination against LGBTQ people generally find that they face significant discrimination in employment (Weichselbaumer, 2003; Drydakis, 2009, 2011, 2014; Tilesik, 2011; Bailey, 2013; Weichselbaumer, 2015; Mishel, 2016) and in housing (Ahmed & Hammarstedt, 2009; Friedman et al., 2013; Levy et al. 2017; Schwegman, Forthcoming).

Pregnant households and families with children may also face disparities in access to mortgage loans. While there little empirical research, that we are aware of, on family-structure discrimination in the mortgage market, anecdotal evidence suggests that mortgage lenders are
less likely to approve the loan applications of pregnant households, as they are concerned about the temporary loss of income caused by maternity or paternity leave (Bernard, 2010). Additionally, Robinson (2002) finds that families with children experience lower rates of mortgage approval.¹

This paper adds to this body of research by conducting the first experiment testing for discrimination on the basis of sexual orientation, family structure, and gender in the mortgage market. While observational studies attempt to control for differences between the groups in question (for example, differences in average income between same-sex and opposite-sex couples), experimental audit/correspondence studies are the “gold standard” and allow the researcher to create fictitious applicants so that all qualities other than minority status are controlled for (Bertrand & Duflo 2016; Oh & Yinger 2015; Neumark, 2018).

We will conduct an email correspondence experiment on licensed Mortgage Loan Originators (MLOs) in the United States. This experiment measures discrimination by examining how MLOs respond to on-average identical emails sent from prospective clients who differ only in their sexual orientation (same-sex or opposite-sex marriage), family structure (have one or two children, are expecting a child, or do not mention children), credit score, and occupation of employment.² We examine the frequency of MLO responses, the rate at which MLOs respond to emails, and the quality of the response to measure differential treatment. We therefore seek to

---

¹ There is also evidence that single parents (as well as same-sex couples) experience discrimination in the rental housing market, see Lauster and Easterbrook (2011). However, our study does not vary marital status as all applicant couples are stated as married.

² In this paper we define discrimination as differential treatment (e.g. differential response rates, differential rate of response, and/or differential response quality) because of an applicant’s sexual orientation and/or family structure. See Yinger (1998) for a summary of both the scholarly and legal definitions of discrimination.

² It is important to note that discrimination laws may not completely stop all discrimination, as discrimination continues to persist amongst federally protected minority groups despite discrimination protections (e.g., Burn, 2018; Neumark, Burn, & Bu
measure the incidence of sexual orientation, family structure, and gender discrimination in the mortgage market. We will then explore how discrimination varies by numerous factors, such as family structure, credit score, occupation and job tenure, and regional factors such as local attitudes about LGBTQ people, the proportion of the population that is LGBTQ, and state laws forbidding discrimination in credit based on sexual orientation.

If discrimination against LGBTQ individuals and individuals with or expecting children exists, this may suggest that expanding discrimination protections to these group, who are largely not covered by federal or state laws, may help reduce discrimination and narrow credit disparities. Federally, LGBTQ people are not covered by federal discrimination laws, either the Equal Credit Opportunity Act (ECOA) or the Fair Housing Act (FHA). At the state level, as of 2017, only 15 state laws (and DC law) cover sexual orientation and gender identity discrimination in the credit market (S. 1143, 2017). Discrimination based on having or expecting children is also not covered under the ECOA, but is covered under the FHA, although the FHA is far less relevant for preventing discrimination in access to mortgages.

---

3 It is important to note that discrimination laws may not completely stop all discrimination, as discrimination continues to persist amongst federally protected minority groups despite discrimination protections (e.g., Burn, 2018; Neumark, Burn, & Button, forthcoming; Hanson et al., 2016; Ross et al., 2008; Ross & Yinger, 2002; Ladd, 1982; Bayer et al., 2016).
4 The Equal Credit Opportunity Act (ECOA) prohibits credit discrimination on the grounds of race, color, religion, national origin, sex, marital status, age, or whether you receive income from a public assistance program. There have been unsuccessful attempts to add sexual orientation to the ECOA. On May 17, 2017, Senator Patty Murray (D-WA) and Representative Josh Gottheimer (NJ-5) introduced the Freedom from Discrimination in Credit Act (FDCA) of 2017, a bill to modify the Equal Credit Opportunity Act to forbid credit discrimination based on sexual orientation and gender identity.
5 The Fair Housing Act (FHA), or Title VIII of the Civil Right Act of 1968, prohibits discrimination in the sale, rental, and financing of residential dwellings and real estate on the basis of race, national origin, religion, sex, family status, or disability. The primary distinction between the FHA and the ECOA is that the ECOA is primarily designed to prevent discrimination in the credit application and credit accounts processing stage of the housing process, whereas the FHA prohibits discrimination in the sale or rental of dwellings.
6 In an agreement with California Credit Union, HUD stated that “refusing to provide a mortgage loan or mortgage insurance because a woman is pregnant or on family leave violates the Fair Housing Act’s prohibition against sex and familial status discrimination, which includes discrimination against individuals who have or are expecting a child. Between 2010 and 2017, HUD received nearly 150 complaints alleging maternity leave discrimination. See: https://www.hud.gov/press/press_releases_media_advisories/2017/HUDNo_17-034 (Accessed: 10/24/18)
Relevant Literature on Sexual Orientation and Family-Status Discrimination

Research on sexual orientation discrimination in the United States originated with Badgett’s (1995) study of the effects of discrimination on gay and lesbian individuals’ wages. Since then, there have been many other studies measuring differential compensation amongst gay men and lesbian women (Klawitter & Flatt, 1998; Allegretto & Arthur, 2001; Badgett 2001; Clain & Leppel, 2001; Berg & Lien, 2002; Antecol, Jong, & Steinberger, 2008).

Research finds that gay men earn 10 to 32 percent less than their straight peers (Badgett et al., 2007). Tilcsik (2011) conducted one of the first large-scale audit studies on sexual orientation discrimination in the United States labor market. He sent fictitious resumes to 1,769 job postings in seven states, signaling for sexual orientation by adding experience in a gay campus organization in the fictitious resumes. He found significant evidence of discrimination against the gay applicants in three of the seven states he studied.

There is less research on sexual orientation discrimination in the United States housing market. Friedman et al. (2013) provide the first measure of sexual orientation discrimination in the United States rental market. Using an email correspondence approach, they find that, relative to opposite-sex couples, same-sex couples received fewer responses to email inquiries sent to landlords (Friedman et al., 2013). Schwegman (Forthcoming) conducts a matched-pair email correspondence study to measure the incidence of sexual orientation discrimination in the United States rental market, finding that same-sex male couples, especially same-sex male couples of color, receive fewer responses to inquiries about rental units (Schwegman, Forthcoming). Levy et al. (2017) conduct an in-person audit study to experimentally test for discrimination against the gays and lesbians in the rental market and estimate that gay men were less likely to receive appointments with housing providers and also received yearly quotes that were, on average, $272
higher than those of straight men. However, they find that lesbian couples were treated the same as straight couples (Levy et al., 2017). Many studies conducted outside of the United States also find evidence of sexual orientation discrimination in their respective rental markets (Ahmed et al., 2008; Ahmed & Hammarstedt, 2009; Lauster and Easterbrook, 2011).

Only a few empirical studies test for housing discrimination on the basis of family structure or gender. Lauster and Easterbrook (2014), employing a small-scale correspondence study of Vancouver, Canada, find that same-sex male couples, single mothers, and single fathers all face significant discrimination relative to heterosexual couples. They hypothesize that single parents, rather than same-sex couples, face discrimination because of their perceived housing risk and economic marginalization. Robinson (2002) finds that familial structure discrimination in mortgage lending varies greatly by race, with White households with children experiencing discrimination when the wife is in the labor market. Conversely, Black and Hispanic families experience discrimination when the wife stays home to care for the children (Robinson, 2002).

While there exist many experimental studies testing for sexual orientation discrimination in the rental market, the only study of sexual orientation and the mortgage market is Gao and Sun (Forthcoming), who find mortgage approval rates for same-sex couples are 3 to 8 percent lower than comparable loan applicants and that once approved, same-sex couples experience financing costs 0.02 to 0.2 percent higher than equally qualified loan applicants. Our study is the first to test, using an email-correspondence field experiment, for this form of discrimination on the mortgage market.

**Background on Mortgages and Mortgage Loan Originators**

Mortgage loan originators (MLOs) are often the primary contact for borrowers during the search and application for a mortgage. MLOs work with potential borrowers to determine
whether the applicant is fit to take out a mortgage. They have discretion over how, and if, they respond to prospective borrowers’ inquiries. An MLO might encourage a borrower to act quickly in order to take advantage of low interest rates, recommend that a borrower wait to improve their credit score before lending, or offer any other advice related to applying for and obtaining a mortgage (Hanson et al., 2016). While they give advice on how to go about getting a loan, they never directly make decisions about accepting or denying a loan request. Discrimination by an MLO could prevent a potential homebuyer from attaining full and fair access to information about mortgages. This lack of information could be harmful to the prospective applicant by restricting their housing search, limiting their ability to effectively negotiate favorable loan terms, or leading them to stop searching for a home all together (Turner et al., 2003).

A potential problem of an email-correspondence study of MLOs is that not all borrowers will go through the process of emailing an MLO to receive information about loans. Borrowers can walk directly into a bank to request information, set up an appointment through an online appointment portal, find information about rates and fees online, or hire a mortgage broker. Mortgage brokers and mortgage loan originators differ in the fact that MLOs are tied to a bank or financial institution while brokers are independent consultants that gain a commission when their client secures a mortgage. Therefore, not everyone is going through the experience of emailing an MLO for information.

We argue, however, that this does not have major implications for the external validity of our findings. If we detect sexual orientation discrimination in this information-gathering phase of the mortgage approval process, it is likely that same-sex couples will experience discrimination in alternative forms of the information gathering process (i.e., going to a bank or

---

7 The Secure and Fair Enforcement for Mortgage Licensing Act (SAFE) placed tighter regulations on MLOs. It led to the requirement of MLO licenses, created a Nationwide Mortgage Licensing System, and implemented uniform licensing applications and reporting requirements across states (Hanson et al., 2016).
hiring a mortgage broker). Detection of sexual orientation discrimination in this phase of the information gathering process also conveys that there is likely discrimination in later phases of the mortgage obtainment process, as sexual orientation is likely to be revealed at some point later in the process.

**Theory of Mortgage Market Discrimination: Why Might MLOs Discriminate?**

Mortgage loan originators may discriminate against same-sex couples for a variety of reasons. This section discusses the possibility of taste-based discrimination, statistical discrimination, and implicit biases in the mortgage market.

Becker (1971) provided the first economic theory of discrimination, where discriminatory behavior results from prejudice of firm owners, employers, employees, or customers. According to Becker’s (1971) model, a discriminatory mortgage loan originator would provide less service or less information to equally qualified same-sex couples as a way to avoid contact with gay or lesbian individuals. This taste-based model hypothesizes that prejudicial individuals lose money and business by discriminating against minority groups (Becker, 1971). In an email-correspondence study, discrimination would manifest in fewer responses for qualified same-sex couples (Schwegman, *Forthcoming*; Murchie, 2017).

Mortgage loan originators may also use sexual orientation as a signal for unobservable characteristics that correlate with a same-sex couple’s credit worthiness and propensity to pay back a loan (Ross & Turner, 2005; Yinger, 1995; Phelps, 1972). Relying on observable group characteristics as a proxy for unobservable characteristics is defined as statistical discrimination (Fang & Moro, 2011). This statistical discrimination could be negative. Badgett et al. (2007) find that gay men earn 10-32 percent less than their straight peers. Badgett et al. (2013) find that 6 percent of lesbian couples live below the federal poverty line, compared to 5.4 percent of
heterosexual couples and 9.4 percent of lesbian families with children live below the poverty line, compared to 6.7 percent of opposite-sex married families. If MLOs are aware of these statistics, they may view same-sex couples as less qualified borrowers and be less inclined to take them on as clients, therefore engaging in statistical discrimination.

However, the statistical discrimination could be in favor of same-sex couples. There is research that finds same-sex male couples earn, on average, higher incomes than opposite-sex couples and that lesbian women earn more than straight women (Badgett et al., 2013; Weichselbaumer, 2003). Also, gay and lesbian individuals are, on average, more educated than straight individuals (Jepsen & Jepsen, 2008). Thus, it is unclear if statistical discrimination will be in favor of or against same-sex couples, and this could of course differ by for same-sex female and male couples.

MLOs may also statistically discriminate against families with children. In the 2010 New York Times article, “Need a Mortgage? Don’t Get Pregnant,” Tara Siegel Bernard reports that mortgage lenders may be less likely to approve mortgage applications for households whose incomes have temporarily fallen, even if that loss in income is associated with taking time off work to take care of a new child (Bernard, 2010). She reports a scenario in which a pregnant oncologist lost her mortgage once her lender discovered she was on maternity leave (Bernard, 2010). Even if a parent plans to return to work within weeks of taking maternity or paternity leave, some lenders will refrain from approval because they are concerned about the household’s loss of income.

In addition to bias against pregnant households, banks may also discriminate against families with children. Research shows that families with children experience lower mortgage approval rates than families without children (Robinson, 2002). Therefore, considering that
MLOs may be wary of taking on clients with children, one could argue that they would prefer same-sex couples to opposite-sex couples, as same-sex couples are less likely to have children. We signal for family structure to account for this possible positive bias towards same-sex couples.

It is also possible that MLOs are not fully aware of their discriminatory tendencies and harbor implicit biases against same-sex couples. Research finds that implicit biases against gay and lesbian individuals persist, even as explicit attitudes towards the gay and lesbian population become more positive (Steffens & Buchner, 2003). Therefore, even if an MLO has no outward dislike for same-sex couples, they may implicitly discriminate against them. Research finds that implicit bias commonly leads to discrimination against minority groups in a variety of scenarios (Rooth, 2010; Hardin & Banaji, 2013; Oswald et al., 2015).

Our estimates of discrimination, if such discrimination exists, will reflect a combination of taste-based discrimination, statistical discrimination, and implicit discrimination. While it can be difficult to separate these three possibilities, we design our experiment to hold children and credit-worthiness (through credit score, occupation of both spouses, and mention of the employment tenure of the email originator) constant, on average. Since we always provide the credit-worthiness information, MLOs have a decent amount of information about credit-worthiness, such that they are unlikely to statistically discriminate. This means our estimates of discrimination in this study are much more likely to pick up taste-based discrimination or implicit bias.

**Signals and Email Content**

To test for sexual orientation discrimination in the home loan market, we conduct an experimental email-correspondence study using emails sent to mortgage loan originators
requesting assistance with obtainment of a mortgage loan. We will measure how sexual orientation, family structure, credit score, and occupation of employment influence treatment of couples by MLOs. Each MLO will receive four emails from four fictitious married couples, with each email signaling for sexual orientation of the prospective borrower. Therefore, an MLO will receive emails from a same-sex male couple, same-sex female couple, opposite-sex couple with a male originator of the email, and opposite-sex couple with a female originator.\(^8\) The design of this experiment follows those of similar email-correspondence studies (Hanson et al., 2016; Ahmed and Hammarstedt, 2009; Giulietti et al., 2017; Schwegman, *Forthcoming*).

**Sexual Orientation Signal**

We signal for sexual orientation in the introduction and body of the email. Each fictitious applicant introduces himself or herself as well as his or her husband or wife. Emails also include discussions of their spouse, in a natural way, throughout the body of the email (see Appendix 1a and 1b). We also alternate and randomly assign if the email mentions both individuals after the valediction (e.g., Sincerely, Nicole and Rachel) rather than just the originator of the email (e.g., Sincerely, Nicole). We use gender-specific names for both the applicant sending the email and his or her spouse to effectively signal whether the email was sent from a same-sex or opposite-sex couple (see Appendix 2). Ahmed and Hammarstedt (2009) use a similar approach, as they signal for sexual orientation in the introduction, body, and after valediction of the email.

The general formula for the email will be: “My name is *[male or female name]* and my *[husband, male name or wife, female name]* and I are interested in taking out a mortgage...” We will then signal for sexual orientation once again later in the email, when discussing how they found the MLO’s contact information. There the email will state, “My *[husband or wife]* found

\(^8\) By male or female originator, we mean that the original email sent to the MLO was sent from a male applicant or a female applicant. This allows us to control for gender.
your information online…” Both individuals are also mentioned again when the email originator mentions the occupation of themselves and their spouse. See Appendix 1a and 1b for the full email construction template and email components.

In these correspondence studies, there is a trade-off between presenting a strong signal and ensuring that the email sounds realistic. We want to guarantee that MLOs recognize the sexual orientation of the perspective homebuyer while still maintaining that the email sounds natural. While we believe that the composition of the email and the decision to reintroduce the signal two to four times throughout the email is realistic, there should be a discussion of threats to external validity here. One could argue that it is unrealistic for a gay or lesbian individual to indirectly signal their sexual orientation in the first email to an MLO, as they might anticipate discrimination and therefore choose to omit that information.

While this is a valid concern, we argue that the information provided in each email is standard and provides the MLO with useful information. Applicants have an incentive to disclose that they are married as there are many benefits to being married when taking out a loan and buying a home. Having two individuals apply, instead of one, improves the application significantly. Also, an application by a married couple, relative to unmarried partners, signals to the financial institution that the relationship is stable, something that is desirable when cosigning on a mortgage. Additionally, the sexual orientation of the couple is very likely to be signaled later in the process, as there are often face-to-face meetings with MLOs after this initial email.

**Credit Score Signal**

---

9 Married couples can deduct interest on up to $1 million worth of mortgage debt while a single taxpayer can only deduct up to $500,000 worth of debt. Married couples also have a better chance of getting a deduction on mortgage insurance premiums. See [http://budgeting.thenest.com/financial-advantages-buying-home-married-25628.html](http://预算ing.thenest.com/financial-advantages-buying-home-married-25628.html) for more information on the benefits of marriage on home ownership.
Following Hanson et al. (2016), we signal for credit worthiness by dividing the emails into credit score groups of low credit score and high credit score. We randomly assign a credit score for each email from a distribution that will be used for all emails within that credit score group. These credit score assignments allow us to do two things. First, we can quantify discrimination in terms of a credit score penalty, whereby being in a same-sex relationship or having children is equivalent to having a lower credit score (e.g., Hanson et al. (2016) find that those with African-American names face a penalty of 71 credit score points). Second, we can explore if discrimination varies by credit score (e.g., discrimination only occurs against same-sex couples with low credit scores).

**Occupation and Tenure Signals**

We include occupation of employment and tenure of employment signals as additional ways to signal for credit worthiness. This is an extension to Hanson et al. (2016), who only use credit score to signal credit worthiness. Occupation and tenure of employment are both seen as important in the loan decision.\(^\text{10}\) We will randomly assign occupation as well as job tenure for each applicant and each applicant’s spouse. We then randomly assign these to emails and ensure that there was no occupation overlap within couple.\(^\text{11}\)

We select occupations that are common enough to be needed in all communities and provide variation in wages or salaries. We use the most recent (May 2017) Bureau of Labor Statistics state-level statistics on employment within occupation data and choose occupations that are at least one percent of total employment within each state and common across all

---

\(^\text{10}\) From discussions with individuals in the mortgage industry, we have learned the MLOs and underwriters tend to use three components to determine mortgage eligibility – occupation tenure (how long you have been employed), credit score, and debt-to-income rations. We unambiguously reveal two of these factors for one of the individuals – occupation tenure (and occupation) and credit score.

\(^\text{11}\) Our concern with occupational overlap is that the context of the email (if written in the vernacular) would have a different syntax if there were overlap in occupations within couples, e.g. they would write: “both my husband and I are construction workers.” This would add an alternative signal and complicated our design (and the execution of the study).
states. Following this criteria, the following occupations are included: registered nurse ($69,713 median annual salary in 2017), retail worker ($27,459), construction worker ($48,161), administrative assistant ($35,850), childcare provider ($23,760) high school teacher ($52,036), human resource manager ($123,510), healthcare administrator ($31,310), psychiatrist ($216,090), and dermatologist ($211,390).

**Children and Fertility Signals**

We randomly assign emails signals of family structure, which signal for expecting a child, already having one child, already having two children, or not mentioning children at all. We do this for three reasons. First, we are independently interested in how children and fertility affect mortgage loan approval. Anecdotal evidence suggests that mortgage lenders are less likely to approve households whose incomes have temporarily fallen, even if that includes taking time off to take care of a new child (Bernard, 2010). Therefore, even if a parent plans to return to work within weeks of taking maternity or paternity leave, some lenders will refrain from approval because of a fear of loss of income. Even after households go back to work, research shows that families with children experience lower mortgage approval rates (Robinson, 2002).

Second, there may be statistical discrimination in favor of same-sex couples, especially same-sex male couples, if they have lower fertility rates, since children can negatively affect mortgage approval rates. Therefore, if we do not control for having or expecting children, the MLOs in this study may actually approve same-sex couples at higher rates, assuming the couple would be less likely to have children. Varying fertility and children signals allows us to explore how discrimination against same-sex couples varies based on this. For example, if discrimination against same-sex male couples is lower when children are not mentioned, relative to when they

---

12 The Occupation Employment Statistics from the Bureau of Labor Statistics can be found: https://www.bls.gov/oes/ (accessed 10/24/18)
are, this could suggest that MLOs are assuming that same-sex male couples are less likely to have children (and having children is viewed negatively).

Third, we are interested in exploring whether same-sex couples face a larger penalty for having children, given the negative opinions on same-sex parenting. According to a 2014 Gallup survey (Jones, 2017), 35 percent of Americans oppose same-sex adoption, compared to 31 percent of Americans opposing same-sex marriage. Considering that opinions on same-sex parenting are more negative than opinions on same-sex marriage, we might find higher rates of discrimination for same-sex applicants with children. And if we find evidence of discrimination, including this signal will allow us to better understand the cause of taste-based discrimination: are discriminatory MLOs opposed to same-sex couples in general, same-sex parenting, or both? If we see lower response rates for same-sex parents than we do same-sex couples without a mention of children, then this suggests that discriminatory MLOs are more strongly opposed to same-sex parenting. If both same-sex and opposite-sex couples with children experience lower response rates, this control may also convey that familial structure discrimination exists, regardless of sexual orientation.

The difficulty, however, is that we cannot disentangle this positive statistical discrimination, that same-sex couples have fewer children, from this negative taste-based discrimination against same-sex parents, since the effects work in the opposite direction (relatively more discrimination when same-sex couples mention children). Our experiment does, however, control for both of these effects in sum through randomizing the mention of children.

Names
To improve our statistical power to detect discrimination based on sexual orientation and family structure, we do not vary race or ethnicity.\textsuperscript{13} Thus, we use common first and last names that generally signal that the individual is likely to be Caucasian. We use the same first names as Friedman et al. (2013). Friedman et al. (2013) used the 20 most popular girls’ and boys’ names in the United States in the 1980s. The list only includes names that strongly signal gender.\textsuperscript{14} We use common last names, from Neumark, Burn, and Button (forthcoming), with these names having been chosen to signal that the individual is likely to be Caucasian. For a full list of the names used, see Appendix 2.

Other Email Content

Once again following Hanson et al.’s (2016) design, we will vary the content of the emails, such as salutation, spacing structure, and questions asked within the email, to make the correspondence more realistic, ensure that not all the emails to each MLO are the same, and improve upon the external validity of this study. Each applicant will specify their desired house size (measured by number of bedrooms) and ask the MLO two loan information questions. We divide the applicants into two different “content groups” and assign questions by content group. One group’s emails will contain questions about interest rates and available loan options. The other group’s emails will ask about mortgage fees and information necessary to move forward in the loan application process. See Appendix 1b for examples.

Sample Size and Sample of MLOs

Sample Size

\textsuperscript{13} It would, of course, be useful to measure intersectional discrimination on the basis of sexual orientation and race or ethnicity. Some recent field experiments set out to do this and find some interesting intersectional relationships (Lahey and Oxley, 2018).

\textsuperscript{14} We, however, replace the name Ashley with the name Alicia, since Ashley is occasionally a male name.
It is important to determine how many observations will be necessary to detect significant differences in response rates by relationship type and family structure. We conduct a power analysis for our primary outcome variable, the response rate. For comparison, Hanson et al. (2016) find that the average response rate for black borrowers is 2.63 percentage points lower than the average rate for white borrowers (86.57%). In their study, Hanson et al. (2016) send out 10,362 emails to 5,181 MLOs (two emails each).

We conducted a power analysis using G*Power (Faul et al., 2007), a popular statistical program. Our preliminary calculation is that to detect a three percentage point difference in response rate between same-sex and opposite-sex couples using an exact Fisher two-tailed test requires 7,906 mortgage loan originators, given the standard levels for significance (α = 0.05) and power (β = 0.8).

However, this calculation does not take into consideration the inter-correlation between clusters (ICC). Power is lost when multiple pieces of correspondence are sent to the same subject, since all correspondence sent to the same subject are correlated and are thus not independent observations (Lahey & Beasley, 2018). G*Power does not incorporate this loss of power and therefore underestimates the necessary sample size. We follow the formula in Lahey and Beasley (2018) to adjust the sample size given the ICC. Using a typical ICC value of 0.2, this suggests that if MLOs are sent four emails then the required sample size is 1.6 times larger than if the same number of emails were sent, but each MLO only got one email. Therefore, when we multiply our preliminary estimate above by 1.6, to account for the ICC, we estimate that we require 12,650 MLOs to detect a three percentage point difference in response rates. This estimate may overshoot what we need, however, since Hanson et al. (2016) were able to find
statistically-significant differences of smaller magnitudes (e.g., 2.63 percentage point difference) using fewer MLOs and fewer emails (5,181 MLOs, 10,362 emails).

Since we have not collected the email addresses for all these MLOs yet, we cannot say exactly what our sample size will be. We commit to do the following. If we can collect more than 12,650 MLOs, we will do an analysis using the entire sample of MLOs. This is important as using more MLOs will increase our power, which is especially important if we seek to determine how discrimination varies through interactions with geography, credit score, or family structure, for example.

However, to avoid any appearance of collecting data until we find significant effects, we do two things. First, we will not analyze the results (outside of a pilot study) until we have collected all the MLO emails. Second, we will estimate our main results with the first 12,650 MLOs and be transparent about how our results change when we add the additional MLOs.

If we do not get 12,650 MLOs, then we will conduct the analysis with our resulting sample. However, if our analysis with this smaller sample size does not rule out meaningful amounts of discrimination then this may suggest that we lack sufficient power to detect discrimination. For example, if we lack power then the standard errors could be large, such that a 95% confidence interval would include meaningful amounts of discrimination (e.g., a point estimate of zero, but a standard error of two percentage points) such that it is not possible to draw conclusions.

**Collection of MLO Email Addresses**

We will create a nationally representative sample of MLOs by using the population of each state relative to the country to guide the selection across geography. Therefore, we will include more MLOs from heavily populated states, regardless of the LGBTQ population in those
states. We want the estimates to best reflect the discrimination experienced by the average gay or lesbian couple.

We will collect the email address, ZIP code, and gender (if obvious to us through a photo and/or name) of each MLO. The email addresses we collect in this study are all provided publicly on a variety of different websites (individual bank websites, Yellow Pages, Better Business Bureau, LinkedIn, etc.). Mortgage loan originators publicize their email addresses online because they are constantly working to expand their client base. Therefore, we only use information that was, and always will be, publicly available to us. We will create a representative sample by pulling email addresses from a majority of states and from a wide range of banks.

**Processing Responses and Measures of Discrimination**

Our main measure of discrimination will be whether the MLO responds to the original email. We consider a response to be one that appears to be written by a human: out-of-office or other automated responses will not be counted as a response. We will only consider responses that were sent within two weeks of the original inquiry email (following Hanson et al., 2016).

We will also measure discrimination through the time-to-response (days between sending the email and receiving the first reply), and if a follow-up email is received, and the number of follow-up emails, and by gauging the quality of the response. We will gauge the quality of the response first in an objective and easy way, through the length of the email (word count) (following Giulietti et al., 2017).

Then we will use a more precise and informative, but subjective, method to assess the quality of the response. Following Hanson et al. (2016), we will determine cordiality of response by using a side-by-side comparison program that allows research assistants compare, qualify, and rank responses. We will hire research assistants to compare responses from individual MLOs on
the basis of cordiality and helpfulness. When an MLO responds to at least two of our emails, research assistants will compare these emails (as a set of two, three, or four depending on the number of responses) to measure cordiality and helpfulness. They will be presented with an individual MLO’s response emails, which will be anonymous and therefore exclude information about the MLO, the couple type, or family composition. Research assistants will be instructed to state whether they think responses are “Similar” (if they thought they were similar in content and helpfulness) or “Not Similar.” If “Not Similar,” they will rank the set of emails in order of helpfulness. We will also provide a series of check boxes where research assistants can indicate the reason(s) for their ordering of emails. Research assistants will also be able to write-in other reasons if they do not believe the available boxes represent their decision. Table 1 lists the check box options provided to each research assistant, which are based partly off those of Hanson et al. (2016).

Statistical Analysis Methodology

Main Estimates of Discrimination We use regression analysis to quantify differences in outcomes (response frequency, rate of response, and quality of response, see Table 2) based on sexual orientation, credit score, occupation, tenure, and family structure. We use the following linear regression model.\(^{15}\)

\[
\text{Outcome}_i = \beta_0 + \beta_{1 \text{gay}}_i + \beta_{2 \text{lesbian}}_i \\
+ \beta_{3 \text{straight female}}_i + \beta_{4 \text{expecting}}_i + \beta_{5 \text{onechild}}_i + \beta_{6 \text{twochild}}_i \\
+ \beta_{7 \text{credit score}}_i + \beta_{8 \text{occupation}}_i + \beta_{9 \text{occupation spouse}}_i + \beta_{10 \text{twoyear}}_i \\
+ \beta_{11 \text{threeyear}}_i + \text{controls}_i \beta_{12} + \epsilon_i
\] (1)

\(^{15}\) We use a linear model regardless of if the outcome variable is binary. While it is recommended to use a logit or probit model, as opposed to a linear model, for binary dependent variables, there are problems associated with including interaction terms in non-linear models (Ai & Norton 2003). However, we will also run probit regressions, correcting for the interactions issue, to measure the robustness of our results.
where *Outcome* is one of our possible outcome variables, *i* indexes each email, *gay* is an indicator variable for same-sex male spouses, *lesbian* is an indicator variable for same-sex female spouses, and *straightwoman* is an indicator variable for opposite-sex spouses where the female is the email originator, with the excluded (comparison) category being opposite-sex spouses where the male is the originator.

*expecting* is an indicator variable for expecting a child, *onechild (twochild)* is an indicator variable for already having one (two) child(ren), with the excluded (comparison) category being no mention of expecting or having children. *creditscore* is a continuous variable for credit score of the applicant.

*occupation (occupationspouse)* is a vector of indicator variables for each possible occupation for the email originator (their spouse), with the excluded (comparison) category being the occupation with the lowest median salary ($23,760 for childcare provider). *Twoyear (threeyear)* are indicator variables for the email originator having a tenure at their occupation for “almost two (three) years”, relative to the excluded (comparison) category of “almost one year”.

*controls* is a vector of controls variables. Given our randomization, these control variables do not vary, on average, by sexual orientation or family structure. However, we will run our regressions both with and without these controls for two reasons. First, we want to show robustness of our results to the inclusion and exclusion of controls. Second, adding controls can increase precision. Our regressions with controls will include the following controls:

- Median household income by MLO office ZIP code (from the Census Bureau)
- Median years of education by MLO office ZIP code (Census Bureau)
- Urban vs. rural status of MLO office ZIP code (Census Bureau)
- Percent homeowners by MLO office census tract (Census Bureau)
Type of Lending Institution i.e., large corporate bank vs. local bank vs. mortgage originator firm, etc. (Recorded during data collection)

**Moderators and Mediators of Discrimination**

Regression equation (1) above only allows us to quantify the impact of sexual orientation, family structure, credit score, occupation, and tenure, each individually. We, however, are also interested in understanding what other factors might influence the discrimination or differential treatment we estimate in equation (1). We will therefore interact our *gay* and *lesbian* indicator variables with other variables that may affect discrimination. Table 3 provides a list of these interaction variables as well as their corresponding hypotheses and data sources. We will test if discrimination rates vary by the local and state anti-discrimination ordinances in places at the state or municipal level. There is significant variation in the degree to which states and localities prohibit housing, employment and public service (among other) discrimination on the basis of sexual orientation. These data will come from the Municipal Equality Index.

We will also test if response rates vary by the type of lending institutions, such as a corporate bank or local credit union, we survey. We expect that corporate lenders may have both a large customer base (e.g. it’s highly unlikely that Wells Fargo, based in San Francisco, does not have gay customers) and are more likely to be aware of (and train employees to know) about fair housing and lending laws.

We will also test if state policies, explicitly those prohibiting credit discrimination on the basis of sexual orientation, correlates with response rates.

**Variance of Unobservable Determinants Issue**

Because our correspondence study includes variation in applicant characteristics that affect eligibility for a loan, we might have a variance of unobservable determinants problem, an
issue Siegelman and Heckman (1993) discuss. Neumark (2012) provides a statistical test to identify whether Siegelman and Heckman’s unobservable variance critique applies to a particular study’s data. He also provides a statistical estimation method that identifies the effect of discrimination (Neumark, 2012). If we detect differences in response rates between same-sex male, same-sex female, and opposite-sex couples, we will apply these methods to recover an unbiased estimate.

**Pilot Study and Future Research Plans**

Our next step is to conduct a pilot study of about 157 MLOs. Pilot studies are useful and fairly standard for both field and lab experiments, as they allow researchers to make adjustments due to unforeseen issues and fix any kinks or issues with the methodology (see, e.g., Lahey and Beasley, 2018). We plan to finish the primary analysis of the pilot study by the January 2019, so that we can present results at the American Economic Association conference in early January in Atlanta.

Once the pilot study is complete, we will incorporate any feedback and any lessons we learned from the pilot study into our main study. We anticipate starting the main study in February 2019. We will begin collecting MLO email addresses to create our full sample. This is expected to take about three months (as it did for Hanson et al. (2016)). Once we have our full sample by about early May, we will then start emailing MLOs, which will take one month (one email per week for four emails per MLO). After waiting two weeks to get all responses back, we anticipate having all our response data from the main experiment by mid June 2019. We will then spend the summer analyzing this data and completing a working paper. We anticipate having a relatively complete working paper by Fall 2019.
Table 1: Reasons for Marking Emails as “Not Similar”

<table>
<thead>
<tr>
<th>Reason for Not Similar</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>More favorable loan terms:</td>
<td>Did the MLO provide more favorable loan terms in the “more helpful” responses? This could include quoted or suggested interest rate, length of loan, fees, etc.</td>
</tr>
<tr>
<td>Friendliness:</td>
<td>Did the “more helpful” responses come across as more “friendly” than others? You do not have to define what you consider “friendly.”</td>
</tr>
<tr>
<td>Provided more detail:</td>
<td>Did the MLO provide more details in the “more helpful” responses? This could be in regards to the mortgage approval process, the products in discussion, or anything else that would be helpful to the applicant.</td>
</tr>
<tr>
<td>Less positive:</td>
<td>Did the “less helpful” responses come across as less positive to you? This could mean they provided less information or came across as unfriendly to the applicant.</td>
</tr>
</tbody>
</table>

Table 2: Outcomes and Hypotheses

<table>
<thead>
<tr>
<th>Outcome Variable</th>
<th>Hypothesis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receive response</td>
<td>Lower response rates for same-sex couples, regardless of credit score or employment status. We may find evidence that households with children and expecting children receive fewer responses.</td>
</tr>
<tr>
<td>Rate of response</td>
<td>Slower response rates for same-sex couples, regardless of credit score or employment status. We may find evidence that households with children and expecting children receive responses at slower rates.</td>
</tr>
<tr>
<td>Quality of Response</td>
<td>Responses to same-sex couples will be of lower quality than opposite-sex couples, regardless of credit score or employment status. This means they may be shorter (in number of words), more negative, less helpful, provide less detail, or offer less favorable loan terms. We may find evidence that households with children and expecting children receive responses of lower quality.</td>
</tr>
</tbody>
</table>

16 Considering that Gao and Sun (forthcoming) found evidence of sexual orientation discrimination in the mortgage market (through lower mortgage approval rates than opposite-sex couples), we expect to find evidence of sexual orientation discrimination in each of our outcome variables.

17 Considering that Robinson (2002) found that families with children experienced lower rates of mortgage approval, we may find lower response rates, slower rates of response, and lower quality of responses for families with children, regardless of sexual orientation.

18 Hanson et al. (2016) found that black applicants received responses at slower rates than their white counterparts.

19 Quality of response is measured by response length and cordiality of response. See Table 1 (above) for an understanding of this “cordiality of response” measure.

20 Hanson et al. (2016) found that black applicants received responses of lower quality than their white counterparts.
<table>
<thead>
<tr>
<th>Interaction Variable</th>
<th>Hypothesis</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>LGBTQ Inclusivity</td>
<td>Rates of S.O. discrimination will vary by region and will decrease as city policies become more inclusive of LGBTQ people</td>
<td>Municipal Equality Index (MEI) from the HRC(^{21})</td>
</tr>
<tr>
<td>Gay and lesbian Population by county</td>
<td>Rates of S.O. discrimination will decrease as gay and lesbian population increases, as found by Gao and Sun (<em>forthcoming</em>).</td>
<td>Williams Institute’s county-level LGBT population estimates(^{22})</td>
</tr>
<tr>
<td>MLO Gender</td>
<td>Effect on S.O. discrimination unclear. Women less likely to discrimination based on gender, fertility, or children.</td>
<td>We record MLO gender, if obvious to us through a photo and/or name during data collection</td>
</tr>
</tbody>
</table>
| Type of Lending Institution                  | We may detect less discrimination from large banks (i.e. Capitol One, Chase) as they may have stricter anti-discrimination policies. | We record the type of lending institution during data collection. Options are:  
  - Large corporate bank  
  - Local bank  
  - Mortgage loan originator firm (national)  
  - Mortgage loan originator firm (local/state-wide) |
| State Policy Protections for LGBTQ Population| We may detect less discrimination in states with LGBTQ policy protections in the credit market. | 15 states and D.C. protect against discrimination on the basis of sexual orientation in the credit market. |

\(^{21}\) The Municipality Equality Index rates cities based on how municipalities include LGBTQ people in laws, policies, and services. They rate cities on non-discrimination laws, the municipality as an employer, public services, law enforcement and city leader’s public position on LGBTQ equality.

\(^{22}\) This source uses 2010 U.S. census data to provide county-level estimates of the LGBT population. The US Census Bureau provides state-level estimates. Same-sex couples are identified in households where Person 1 describes his or her relationship with another adult of the same sex as either a married or unmarried partner. The Williams Institute then adjusts this data to provide county, city, and tract data. This is most likely an undercount, as there is a possibility that some same-sex couples did not report their partners due to concerns about privacy or because neither partner was Person 1 in the household.
Appendix 1a: Email Template

1) [EMAIL SUBJECT LINE]

2) [GREETING],

My name is [MALE NAME or FEMALE NAME] and my [HUSBAND, MALE NAME or WIFE, FEMALE NAME] and I are interested in 3) [PRODUCT]. We 4) [HOME SEARCH] 5) [X] bedrooms 6) [if children, then: because we 6a) [ARE EXPECTING] or 6b) [HAVE (X CHILDREN or KIDS)].

7) [SOURCE]

8) [CREDIT SCORE] [RANDOMLY ASSIGNED SCORE WITHIN HIGH OR LOW GROUP]. I have been 9a) [OCCUPATION] for 9b) [OCCUPATION TENURE] years and [spouse name] is a 9c) [SPOUSE OCCUPATION].

10) [PLEASANTRY]

11a and 11b) [QUESTION #1a or QUESTION #2a]

12a and 12b) [QUESTION #1b or QUESTION #2b]

13) [VALEDICTION],

[NAME]
# Appendix 1b: Email Components

<table>
<thead>
<tr>
<th>1) EMAIL SUBJECT LINE</th>
<th>2) GREETING</th>
<th>3) PRODUCT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Requesting information about a mortgage</td>
<td>Hello</td>
<td>A home loan</td>
</tr>
<tr>
<td>Mortgage loan questions</td>
<td>Hi</td>
<td>A mortgage loan</td>
</tr>
<tr>
<td>Questions regarding applying for a home loan</td>
<td>Greetings</td>
<td>Getting a home loan</td>
</tr>
<tr>
<td>Inquiry about mortgage information</td>
<td></td>
<td>Applying for a home loan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4) HOME SEARCH</th>
<th>5) BEDROOM NUMBER:</th>
<th>6) STATUS OF CHILDREN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Are looking for a home of X bedrooms</td>
<td>Dependent upon children</td>
<td>Expecting</td>
</tr>
<tr>
<td>Are in search of a house with X bedrooms</td>
<td>No children:</td>
<td>Have</td>
</tr>
<tr>
<td>Would like to find a home with X bedrooms</td>
<td>1 bedroom</td>
<td></td>
</tr>
<tr>
<td>Want a house with X bedrooms</td>
<td>2 bedrooms</td>
<td></td>
</tr>
</tbody>
</table>

**6a) if EXPECTING**
- We are expecting our first child
- We are pregnant with our first baby
- We are expecting our first kid
- We are having our first baby soon

**6b) if HAVE**
- 1 child
- 1 kid
- 2 children
- 2 kids

<table>
<thead>
<tr>
<th>7) SOURCE</th>
<th>8) CREDIT SCORE</th>
</tr>
</thead>
<tbody>
<tr>
<td>My [husband/wife] found your information online and thought you could help us.</td>
<td>My credit score is</td>
</tr>
<tr>
<td>My [husband/wife] and I got your contact information online and we hope that you can answer some questions for us.</td>
<td>I know that my credit score is</td>
</tr>
<tr>
<td>My [husband/wife] and I found you on the web and think you might be able to help.</td>
<td>I already know that my credit score is</td>
</tr>
<tr>
<td>My [husband/wife] got your information online and we think you</td>
<td>I am aware that my credit score is</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Appendix 1b: Email Components, continued

<table>
<thead>
<tr>
<th>9a) OCCUPATION</th>
<th>9b) OCCUPATION</th>
<th>9c) SPOUSE OCCUPATION</th>
<th>10) PLEASANTRY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Nurse</td>
<td>N TENURE</td>
<td>Same as</td>
<td>We have a few questions for you.</td>
</tr>
<tr>
<td>Retail Worker</td>
<td>Less than a Year</td>
<td>Occupation. Randomize so they do not match</td>
<td>We are emailing to ask a couple questions.</td>
</tr>
<tr>
<td>Construction</td>
<td>About a Year</td>
<td></td>
<td>We are curious about a couple of things.</td>
</tr>
<tr>
<td>Worker</td>
<td>Almost 2 Years</td>
<td></td>
<td>We were wondering about a few things.</td>
</tr>
<tr>
<td>Admin Assistant</td>
<td>Almost 3 Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Childcare Provider</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Human Resource</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manager</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychiatrist</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dermatologist</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>11a) QUESTION #1a</th>
<th>11b) QUESTION #2a</th>
</tr>
</thead>
<tbody>
<tr>
<td>What interest rate should we expect?</td>
<td>What is an estimate of the expected fees?</td>
</tr>
<tr>
<td>Can you provide us with information about current interest rates?</td>
<td>What are the typical fees?</td>
</tr>
<tr>
<td>What do interests rates looks like currently?</td>
<td>What fees should I expect?</td>
</tr>
<tr>
<td>What kind of interest rates should we anticipate?</td>
<td>Do you have an estimate of the fees I would pay?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>12a) QUESTION #1b</th>
<th>12b) QUESTION #2b</th>
</tr>
</thead>
<tbody>
<tr>
<td>What types of loans are available to us?</td>
<td>What other information will you need from me?</td>
</tr>
<tr>
<td>Can you provide us with information on the available loans?</td>
<td>Do you need any additional information?</td>
</tr>
<tr>
<td>What kinds of loans are offered?</td>
<td>What other sort of information do you need moving forward?</td>
</tr>
<tr>
<td>Can you explain to us what types of loans are available?</td>
<td>What more will you need from me?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>13) VALEDICATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sincerely</td>
</tr>
<tr>
<td>Thank you</td>
</tr>
<tr>
<td>Best Regards</td>
</tr>
<tr>
<td>Thank you very much</td>
</tr>
</tbody>
</table>
Appendix 2: Names

<table>
<thead>
<tr>
<th>MALE</th>
<th>FEMALE</th>
<th>LAST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrew</td>
<td>Amanda</td>
<td>Adams</td>
</tr>
<tr>
<td>Brandon</td>
<td>Alicia</td>
<td>Allen</td>
</tr>
<tr>
<td>Brian</td>
<td>Brittany</td>
<td>Anderson</td>
</tr>
<tr>
<td>Christopher</td>
<td>Christine</td>
<td>Baker</td>
</tr>
<tr>
<td>David</td>
<td>Danielle</td>
<td>Campbell</td>
</tr>
<tr>
<td>Eric</td>
<td>Elizabeth</td>
<td>Clark</td>
</tr>
<tr>
<td>James</td>
<td>Heather</td>
<td>Evans</td>
</tr>
<tr>
<td>Jason</td>
<td>Jennifer</td>
<td>Hall</td>
</tr>
<tr>
<td>Jonathan</td>
<td>Jessica</td>
<td>King</td>
</tr>
<tr>
<td>Justin</td>
<td>Julie</td>
<td>Martin</td>
</tr>
<tr>
<td>Kevin</td>
<td>Karen</td>
<td>Miller</td>
</tr>
<tr>
<td>Mark</td>
<td>Lauren</td>
<td>Moore</td>
</tr>
<tr>
<td>Michael</td>
<td>Melissa</td>
<td>Nelson</td>
</tr>
<tr>
<td>Nicholas</td>
<td>Michelle</td>
<td>Phillips</td>
</tr>
<tr>
<td>Richard</td>
<td>Nicole</td>
<td>Roberts</td>
</tr>
<tr>
<td>Ryan</td>
<td>Rachel</td>
<td>Smith</td>
</tr>
<tr>
<td>Steven</td>
<td>Rebecca</td>
<td>Thompson</td>
</tr>
<tr>
<td>Thomas</td>
<td>Sarah</td>
<td>Wilson</td>
</tr>
<tr>
<td>Timothy</td>
<td>Stephanie</td>
<td>Wright</td>
</tr>
<tr>
<td>William</td>
<td>Tiffany</td>
<td>Young</td>
</tr>
</tbody>
</table>

Notes: First names are from Friedman et al. (2013). These are the 20 most popular girls’ and boys’ names in the United States from 1970 to 1985. To ensure all names strongly signal gender, we use Alicia instead of Ashley since Ashley is occasionally a male name. We use last names from Neumark, Burn, and Button (forthcoming).
References


Gao, L. & Sun, H. "The Rainbow of Credit: Same-Sex Mortgage Discrimination and Two-sided Spillover Effect", *accepted by the Proceedings of the National Academy of Sciences of USA* (PNAS).


Pew Research Center (2017) Support for Same-Sex Marriage Grows, Even Among Groups That Had Been Skeptical, Pew Research Center


Schwegman, D. *(Forthcoming)* Rental Market Discrimination against Same-Sex Couples: Evidence from a Pairwise-Matched Email Correspondence Test. Forthcoming in *Housing Policy Debate*


